

In a modified arrangement, Figs. 19A-D, a structure 87 is attached to the hopper and includes U-shaped element 87a having arms 88, 89. Arm 88 can bend at junction 90 between arms 88, 89. When the hopper is inserted into the housing, arm 89 moves slightly towards arm 88 and they pass through gap 91 and arm 89 then moves away from arm 88 (Fig. 19B) so that the hopper cannot be removed because of engagement with the ring 82. As the ring is rotated step by step during use, a peg 93 causes arm 88 fully against arm 89 and they are held in this position by a catch 94 so that (Fig. 19C) when the gap 91 returns to the initial position the arms 88, 89 can pass through the gap 91 stretching the spring 86 to eject the hopper. If the hopper is reinserted it will again be ejected. The arms 88, 89 form a structure with two stable positions (Fig. 19A, Fig. 19D).

In the arrangement of Figs. 20A-D the hopper 33 has an aperture 98 in which a projecting latch 99 can slide. When the hopper is inserted the latch 99 is at one end of the aperture engages a shoulder 97 at one end of a cam surface 96 on the ring 82 to move the ring 82 to a hopper-retaining position (Fig. 20B). As the wheel 81 is rotated to use, the latch 99 engages the cam surface 96 and is moved to the other end of the aperture 98 when the device 30 is empty, at which stage the spring 86 ejects the hopper. If the empty hopper is reinserted the latch 99 does not engage shoulder 97 and the hopper is again ejected. The latch 99 thus has two operating positions at the ends of the aperture.

Figs. 21, 22A-D show another means for opening a hopper with its outlet face closed by a sealed metal tab 100. The outlet of the hopper is formed by walls 101 surrounded by a channel 102. Mounted in the housing is a generally rectangular device 103 open at its ends and having walls 104, 105, 106, 107. The upper edges of walls 104, 105, 106 are formed as cutters which cut the foil as the hopper is inserted.

The edge of wall 107 is convex and this pushes the foil which has been cut on three sides into one side of the channel (Fig. 22D). When the hopper has been inserted, the walls 104-107 are in the channel 102.

Preferably the device 30 is provided with a measure of resistance to undesired use, or child proofing. A3 shown in Fig. 23, one side of the housing 31 is provided with a trigger-like portion 110 pivoted at one end 111 and gripped during use. A rotatable locking member 112 is slightly mounted to project through an aperture 113 in wall 40. The member 112 is provided with a tab 114 which prevents movement of the member 112 in the aperture 113. A latch shown schematically at 115 connects the trigger 110 and the part 42 so that if the trigger 110 is in the datum, unoperated condition the part 42 cannot be operated to dispense an article. If the tab 114 is removed by pulling off, the member 112 can move in the aperture 113. The trigger is provided with two spaced notches 116, 117.

With the tab 114 removed and the member 112 at the lower end of aperture 113, the trigger 110 can be squeezed to release the latch 115 and the part 42 can be operated (Fig. 24A). The requirement to squeeze the trigger 110 provides a degree of child proofing.

If the trigger 110 is in the unoperated state and the member 112 is moved into notch 117 to hold the trigger in squeezed condition (Fig. 24C), the part 42 can be operated and the child proofing is removed; this would be for users who through age or infirmity are unable to, or unable readily to, squeeze the trigger 110.

It will be noted that the operating part 42 is at a corner of the housing 31, so that the housing 31 can be rested on any side without operating the part 42.

The suitable parts are joined by walls in the housing some of which are omitted for clarity.

The zone 35 may have transparent walls so that a dispensed article can be seen, and have one or more apertures 35a Fig. 1 through which the dispensed article can be recovered through an aperture 35a by manipulating the device 30, for example the article can fall onto a plate or pass direct into a user's mouth.

If desired the article rest zone 35 could be omitted and the article fall direct from the device 30.

The position of bay and keyway 78, 77 is different for different hoppers so that each housing will cooperate only with hoppers with the correct bay 78. Hoppers with different bays 78 are loaded with different articles 36. A user with a particular housing 31 can only receive articles appropriate to a housing having the relevant bay 78.

There could be a spring to assist in dispensing the article 36a (Fig. 4). A second embodiment is illustrated in Figs. 25-40. Components having functions similar to those of the first embodiment retain the same label number.

A device 30 comprises a housing 31 including a dispensing mechanism 32 and a hopper 33 for use in introducing into the device articles which are to be dispensed. In this embodiment, the dispensing zone 35 is located within the dispensing element 34, which is slightly mounted in the housing 31.

The housing 31 is a storage region 37 which receives the hopper 33, as in the first embodiment. A dispensing outlet passage 38 leads from a lower end of the region 37 which, as seen in Fig. 29, is flanked by walls 39, 39a which are inclined towards the passage 38. The region 37 has parallel walls 40, 41 spaced so as to confine the stored articles 36 to a single plane.

The dispensing element 34 is located at the base of the housing, Fig. 26. When the user presses the device

downwards on a surface this element retracts into the housing. A shuttle 123 located in a channel in one wall of the housing is moved to the position shown in Fig. 29 by shuttle driver 124, having a follower 125 which rests in a groove 126 in an upstanding wall 63 of element 34 (see Figs. 31A-D and 32). Article 36a drops into position in the gap 43 between shuttle 123 and a free shuttle 122, which is urged to its position in Fig. 29 by a light spring (not shown). When the device is raised, element 34 is returned to its starting position by means of a spring (not shown).

The shuttle driver 124 returns shuttle 123 to its starting position (Fig. 27). If the article 36a has successfully fallen to its position in Fig. 27, the article is urged into contact with the free shuttle 122 and moved laterally to the delivery position in Fig. 28. A final slight retraction of shuttle 123 caused by the cracked top end of probe 120 allows the article to drop through the dispensing zone into the dispensing element 34, from which it can be dispensed into the user's hand or mouth, or into another receptacle.

If article 36a became trapped in the position shown in Fig. 29, then spring 120 would compress and prevent damage to the trapped article.

The counting mechanism in this embodiment is shown in Fig. 33. Element 34 has a hole 79 which engages

a peg on the back of free shuttle 122, this peg projecting through a slot in the housing wall. When the device is operated and an article 36a is successfully delivered, element 34 is moved to the right (Fig. 33), and a ratchet arm on element 34 engages ratchet teeth 53 on counter wheel 51. Wheel ends 52 comprise a ratchet mechanism to prevent reversal of counter wheel 51 when the device is reoperated and element 34 is moved to the left. If no article 36a is dispensed, either because no article falls into place or because of jamming, then shuttle 122 does not move and the counter wheel is not advanced. The number of articles dispensed is viewed through a window 58 in housing 31.

The means to prevent trapping or jamming in this embodiment is shown in Figs. 35-37. The upstanding wall of element 34 terminates in two parallel notches 64 having catched teeth 65. These co-operate with toothed wheels 63 which extend through the wall of the housing to drive wheels 61, 62 having blades 66 which are rotated in the directions indicated when the device is activated, displacing the article in a generally upward direction. Reversal of rotation is prevented by fingers 67 (Fig. 33) provided in the housing wall. The blades are set in shallow wells in one wall of the housing, the geometry being such that it is impossible to trap an article between a blade and the side of the housing.

In this embodiment, retention of the hopper is effected as shown in Figs. 38A-D. When hopper 33 is inserted into the housing base 78 passes through gap 81. A bi-stable mounted peg 96 mounted within the housing 121 on the hopper engages shoulder 97 of the counter wheel 51 to rotate it so that base 78 is trapped within ring 82. As counter wheel 51 is rotated in use, peg 96 is moved by cam surface 98 to its second stable position. The hopper is ejected by a spring when counter wheel 51 has completed its rotation and base 78 is again aligned with gap 81. On re-introduction of the hopper with peg 96 in this second position, no contact with shoulder 97 would occur, and counter wheel 51 would not be rotated into the position where base 78 is trapped. The hopper would therefore be immediately ejected.

In the final embodiment, the trigger device 110 (Fig. 30) must be depressed before the dispensing mechanism can be activated. In this embodiment, the locking mechanism comprises a slideable locking member 112 (Fig. 32) which can engage notch 119 to prevent activation and provide a degree of child-proofing (Fig. 40).

For someone finding a gripping motion difficult, the trigger can alternatively be locked into its operating position by engaging member 112 with notch 117, as in Fig. 40C.

Claims

1. A device for dispensing articles comprising:
 - a container for articles,
 - a housing for receiving the container comprising a storage region for articles,
 - dispensing means operable to dispense an article from the storage region, operation of the dispensing means being arranged to move an article from a holding position to a dispensing position,
 - means responsive to operation of the dispensing means for counting the number of operations, the counting means being operable only when an article is dispensed, and
 - means for retaining removal of the container from the housing until all the articles have been dispensed.
2. A device as claimed in Claim 1, in which the dispensing means comprises first and second parts between which the article to be dispensed is received in the holding position, and a fast motion connection between the first and second parts so that the second part moves with the first part only when an article is received between the first and second parts, the counting means being responsive to movement of the second part.

parts so that dispensing movement of the first part only moves the second part when an article is in the holding position.

3. A device as claimed in Claim 1, in which the storage region has an outlet passage leading to the holding position, the outlet passage being arranged to receive articles in a declined orientation.
4. A device as claimed in Claim 1, comprising means operated by operation of the dispensing means for disturbing articles in the storage region, the disturbing means comprising rotary means having elements extending into the storage region adjacent an inlet to the outlet passage.
5. A device as claimed in Claim 1, including security means switchable between an inoperative position in which operation of the dispensing means is resisted to an operative position in which operation of the dispensing means is permitted.
6. A device as claimed in Claim 5, including means for releasably holding the security means in the inoperative position or in the operative position.
7. A device as claimed in Claim 1, in which the dispensing means comprises first and second parts between which an article to be dispensed is received in the holding position, and a fast motion connection between the first and second parts so that the second part moves with the first part only when an article is received between the first and second parts, the counting means being responsive to movement of the second part.
8. A device as claimed in Claim 1, in which the means for retaining removal of the container comprises co-operable means of the housing and container responsive to receipt of the container by the housing, wherein first and second formations on the container cooperate respectively with first and second formations in the housing, engagement of the first formations on receipt of the container causing the second housing formation to cooperate with the second container formation to resist removal of the container, operation of the dispensing means to dispense the articles moving the second housing formation out of cooperation with the second container formation.
9. A device as claimed in Claim 8, in which the first container formation is caused by bi-stable means so as to be movable between an operative position in which the first container formation can cooperate with the first housing formation and an inoperative position, the first container formation being moved to the inoperative position prior to removal of the container from the housing.
10. A device as claimed in Claim 8 comprising eject means operable to eject the container from the housing when the retaining means is rendered ineffective on dispensing of all the articles.
11. A device as claimed in Claim 8, in which the eject means comprises spring means energised by receipt of the container by the housing.
12. A device as claimed in Claim 1 wherein the container for articles has an outlet, a closure for the outlet, the housing and container having co-operable means which open the outlet on receipt of the container by the housing.
13. A device as claimed in Claim 12 in which the closure is a flexible membrane, and the housing comprises means on insertion of the container into the housing to cut the membrane and to move the cut membrane from the outlet, the cut membrane being pushed into a recess in the container.
14. A device as claimed in Claim 13, in which the outlet has four sides and the membrane extends beyond the sides of the outlet and the means cuts the membrane along and outside three sides and pushes the membrane along and outside the fourth side to move the cut membrane into the recess.

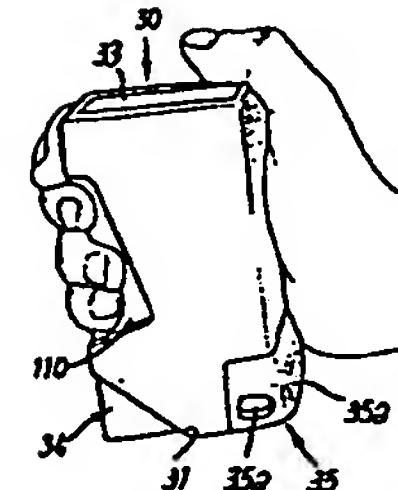


Fig. 1

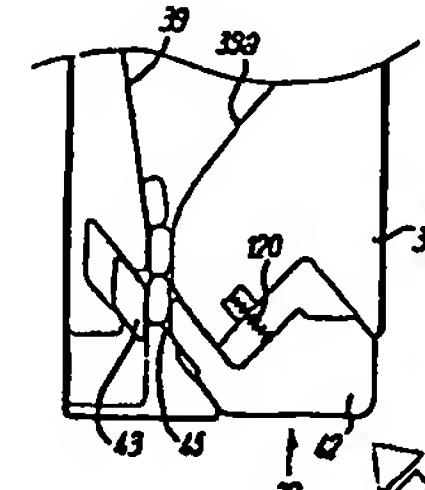


Fig. 2

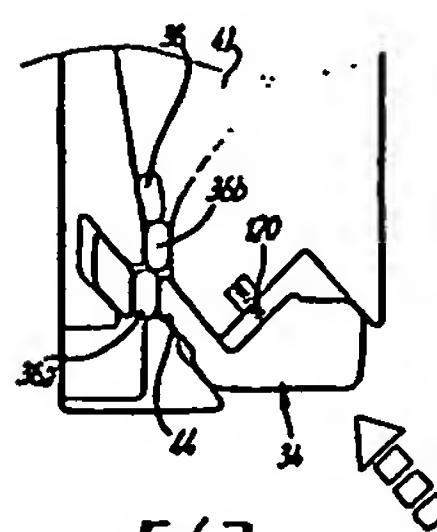


Fig. 3

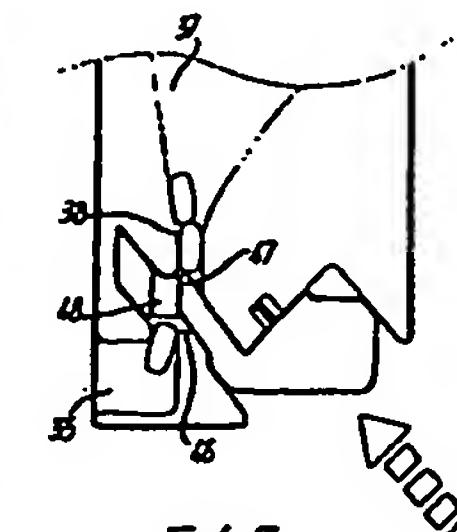
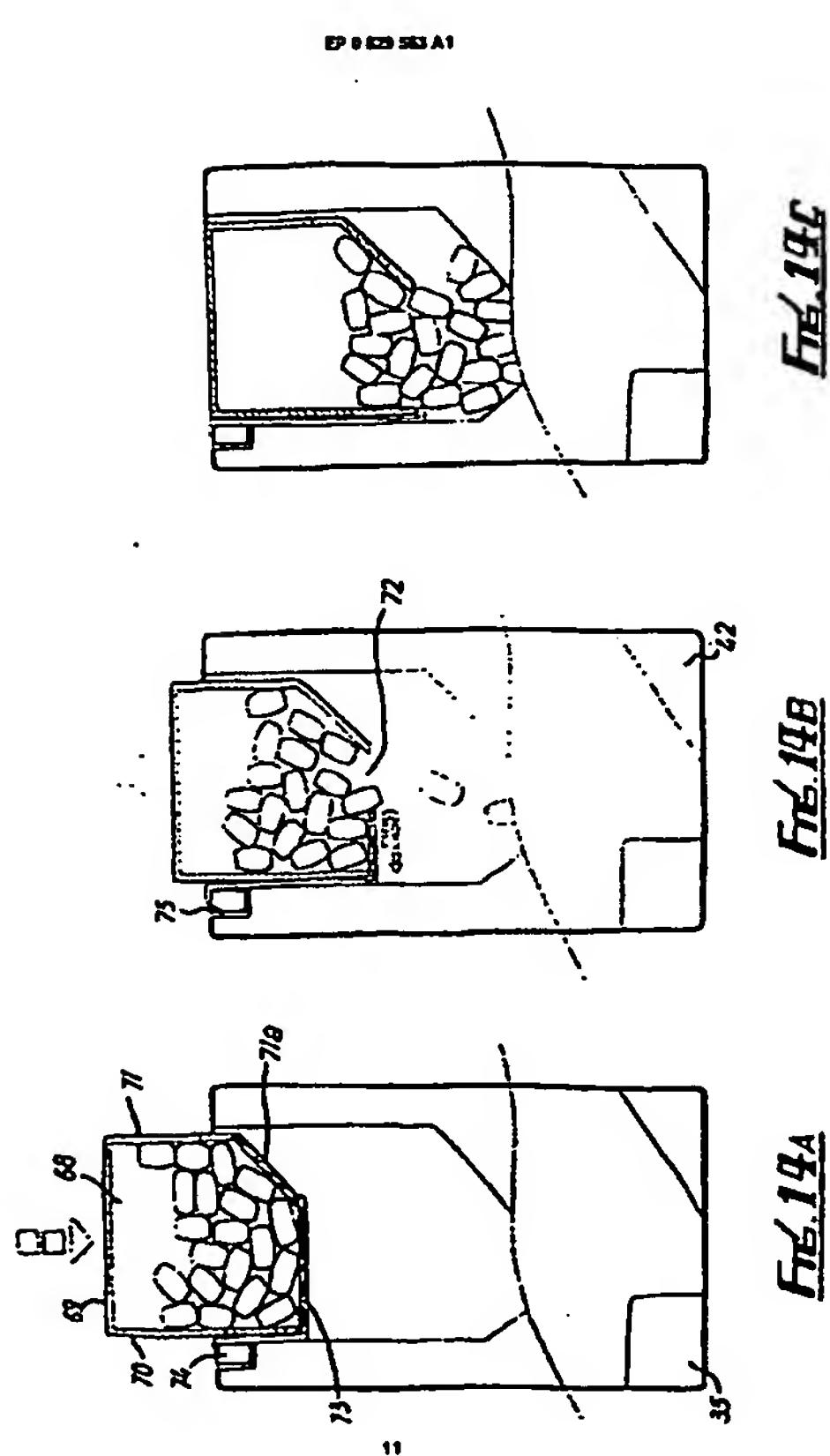
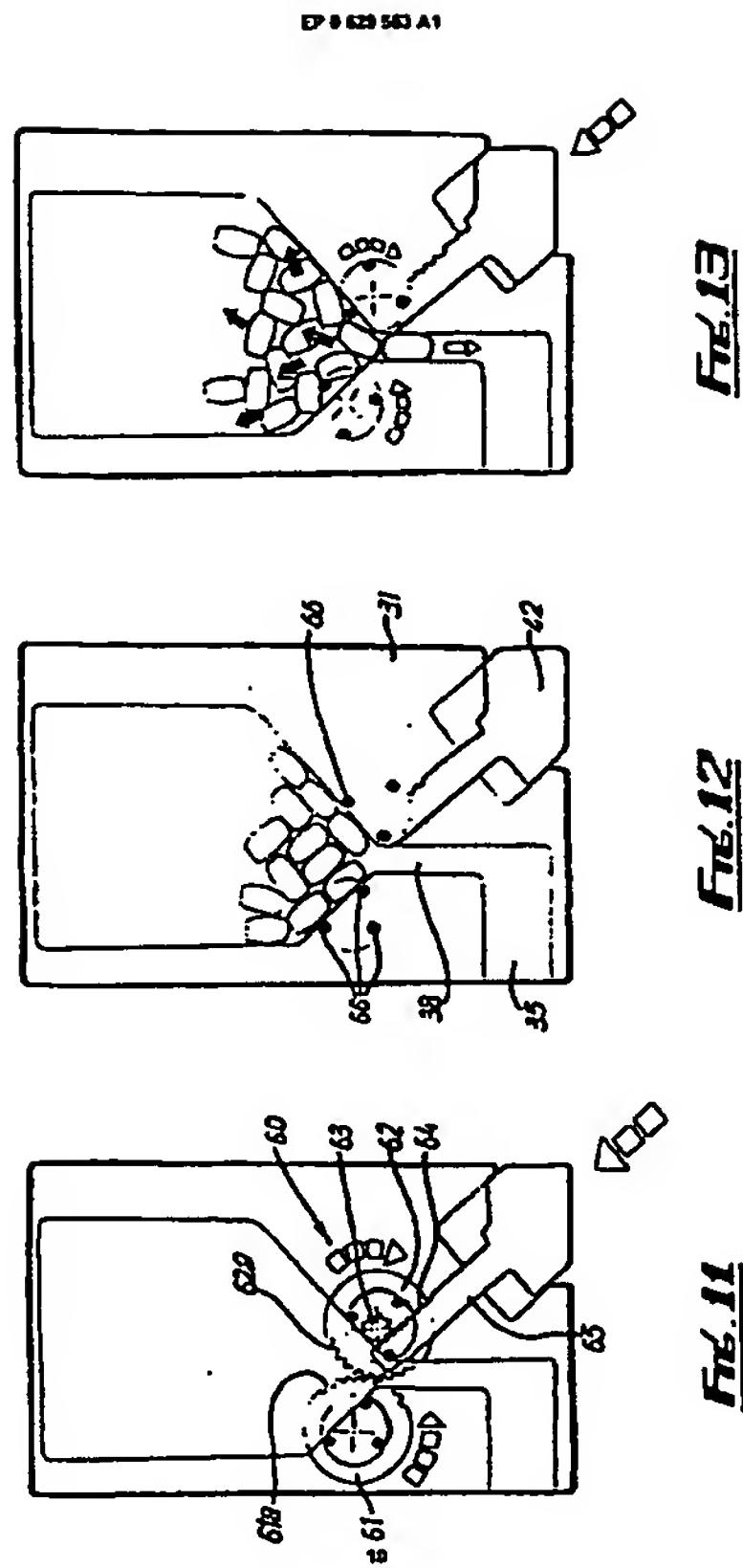
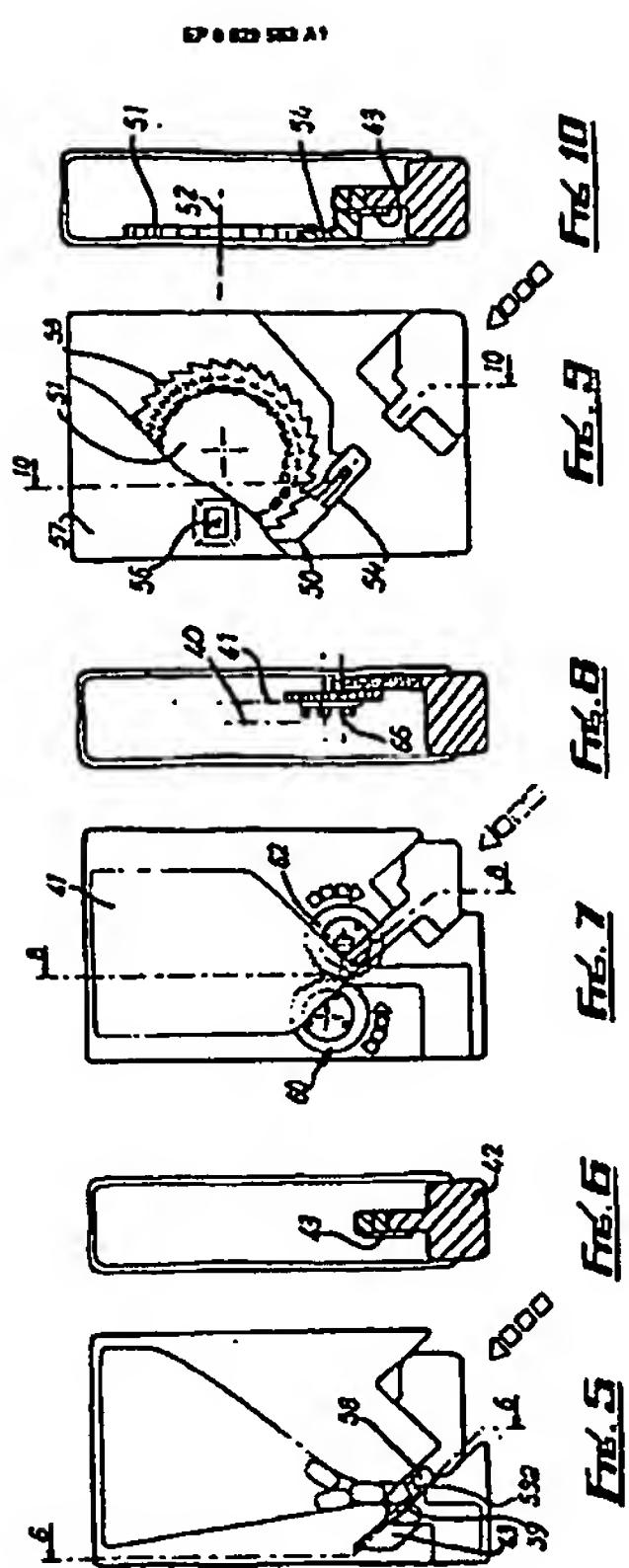


Fig. 4



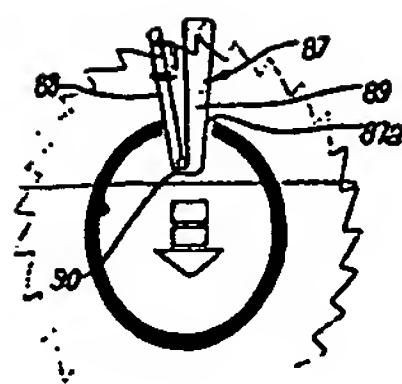


Fig. 19A

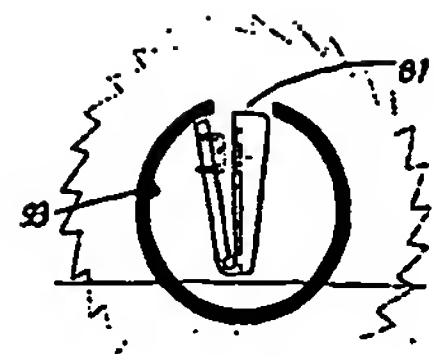


Fig. 19B

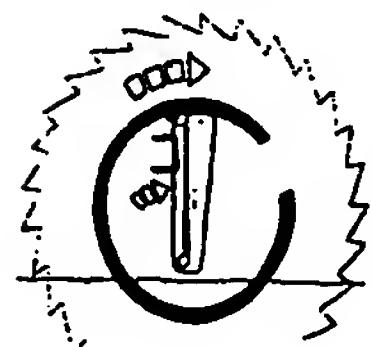


Fig. 19C

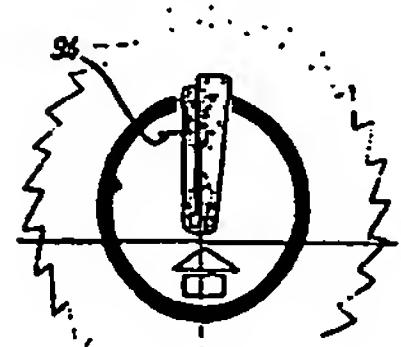


Fig. 19D

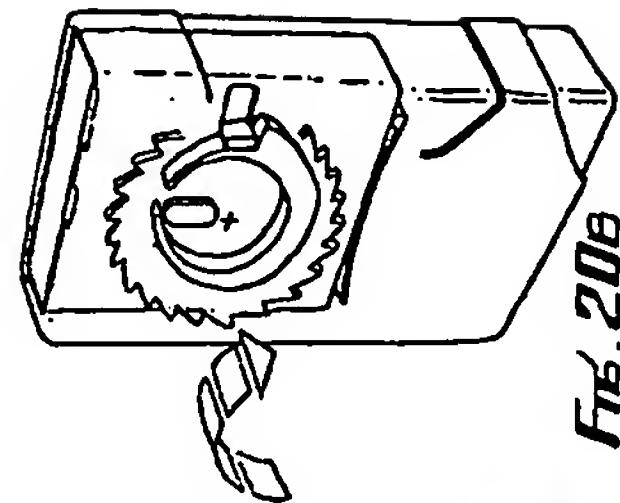


Fig. 20B

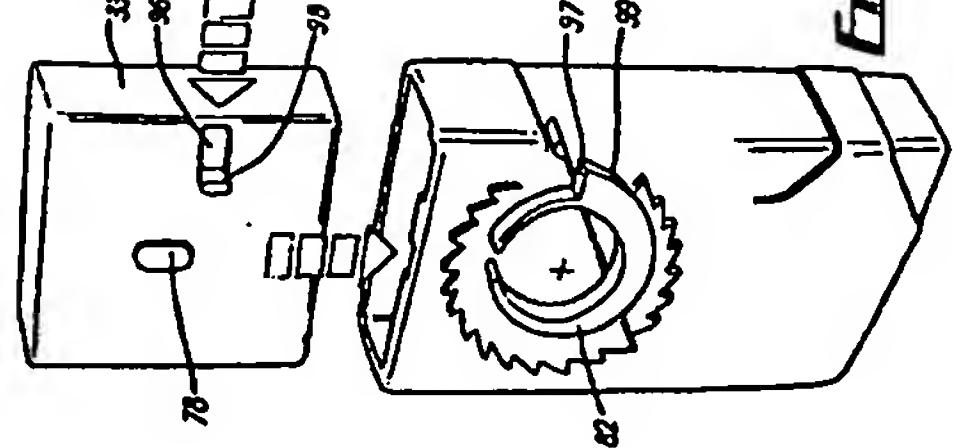


Fig. 20A

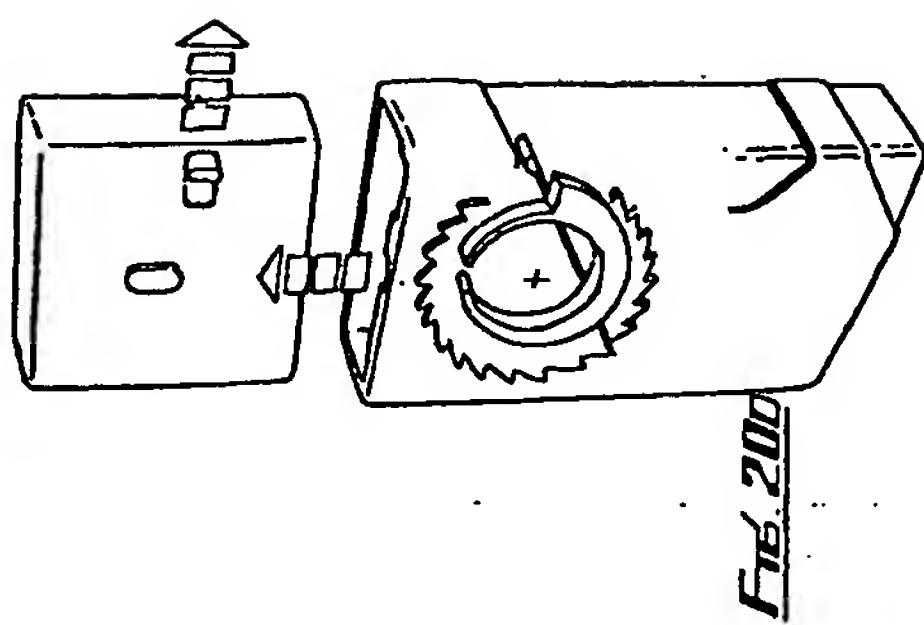


Fig. 20D

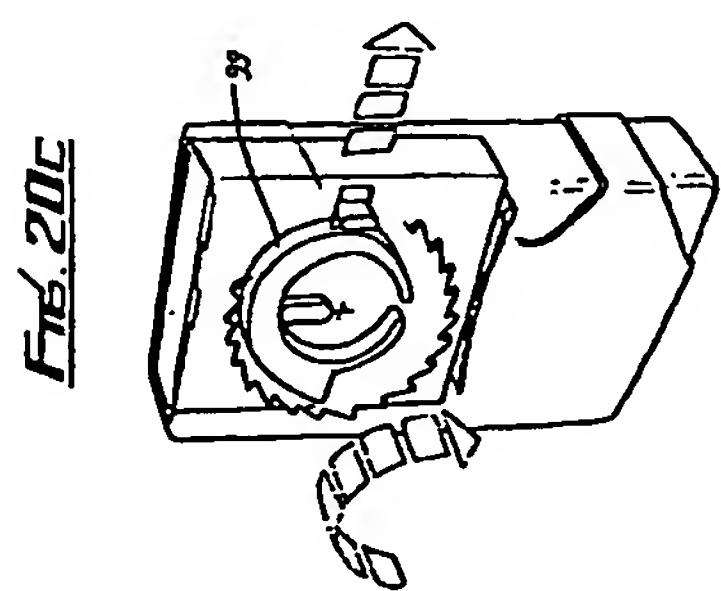


Fig. 20E

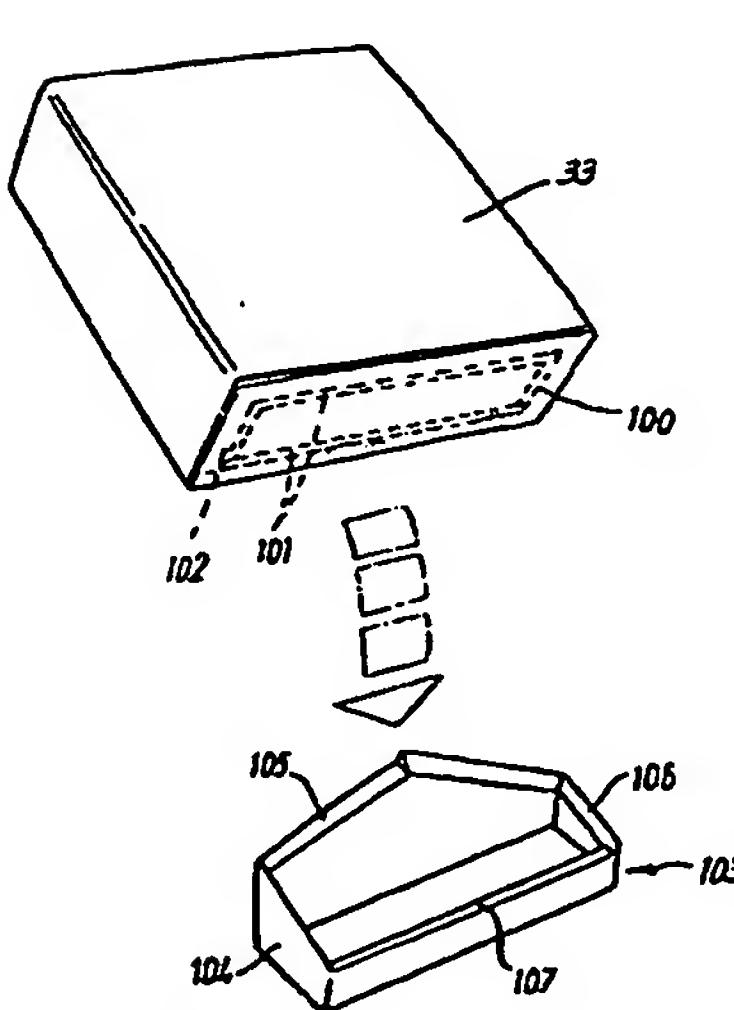


Fig. 21

